

TROPICAL STORM SUSAN BEST TRACK TC-22W

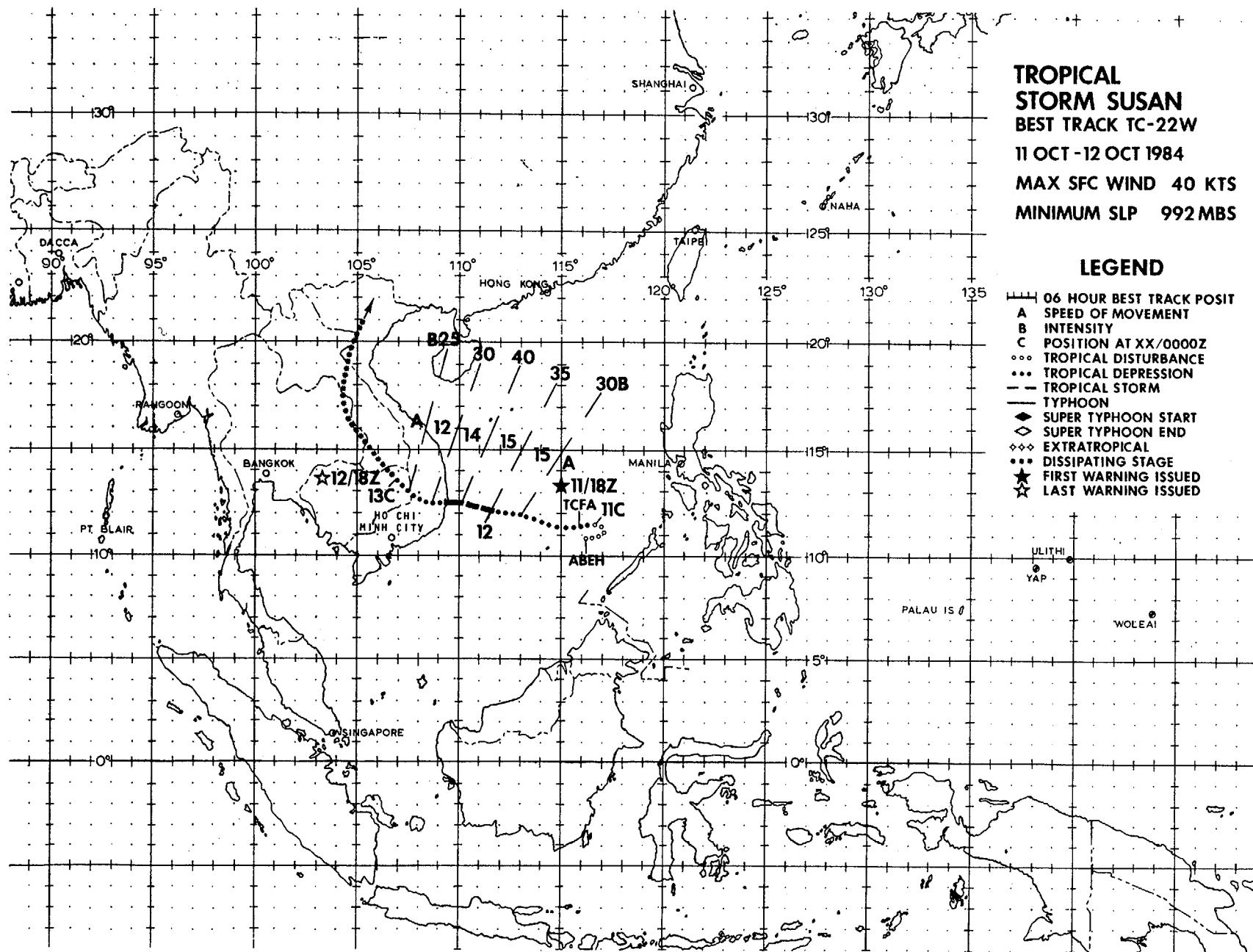
11 OCT -12 OCT 1984

MAX SFC WIND 40 KTS

MINIMUM SLP 992 MBS

LEGEND

- 06 HOUR BEST TRACK POSIT
- A SPEED OF MOVEMENT
- B INTENSITY
- C POSITION AT XX/0000Z
- ... TROPICAL DISTURBANCE
- ... TROPICAL DEPRESSION
- TROPICAL STORM
- TYPHOON
- ◆ SUPER TYPHOON START
- ◇ SUPER TYPHOON END
- ◆◆ EXTRATROPICAL
- ... DISSIPATING STAGE
- ★ FIRST WARNING ISSUED
- ★ LAST WARNING ISSUED



TROPICAL STORM SUSAN (22W)

Tropical Storm Susan was the third of four significant tropical cyclones to develop in the monsoon trough in less than two days. During a brief existence Susan caused considerable damage to central Vietnam despite only intensifying to 40 kt (21 m/s).

Occasionally, when a typhoon is active in the Philippine Sea a "sympathetic" storm will form in the South China Sea. Recent examples of such storm pairs are Abby/Carmen and Orchid/Percy from the 1983 season. The mechanism at work in these cases is a combination of excess vorticity and convergence at low-levels, found around circulation centers embedded in the monsoon trough, and upper-level ventilation due to the divergence in the outflow downstream (west) of the dominant typhoon in the Philippine Sea. These "sympathetic" storms often exhibit erratic movement and are the victims of significant upper-level shearing. Intensification beyond minimal typhoon strength is unusual.

As a first impression, one might

assume that this scenario was valid in the case of Tropical Storm Susan. The surface situation present as Susan was forming is shown in Figure 3-22-1. The monsoon trough extends from the Marshall Islands across Micronesia, the Philippines, Southeast Asia and into the Bay of Bengal. Embedded within this trough is the precursor of Tropical Cyclone 02B in the Bay of Bengal, the depression that is soon to be Susan in the South China Sea and the short-lived Tropical Storm Roy just west of Guam. Tropical Storm Phyllis (soon to be typhoon Phyllis) had recently separated from the trough and was accelerating to the north. The first impression, however, is incorrect in this case. Susan was not a sympathetic storm induced by either of the storms to the east, but was instead a completely independent system. The inflow patterns about Roy and Phyllis disrupt each other whereas the flow around Susan dominates the entire South China Sea and controls much more mass than the other two. Given time and more open ocean, Susan would probably have become the most intense of the four systems.

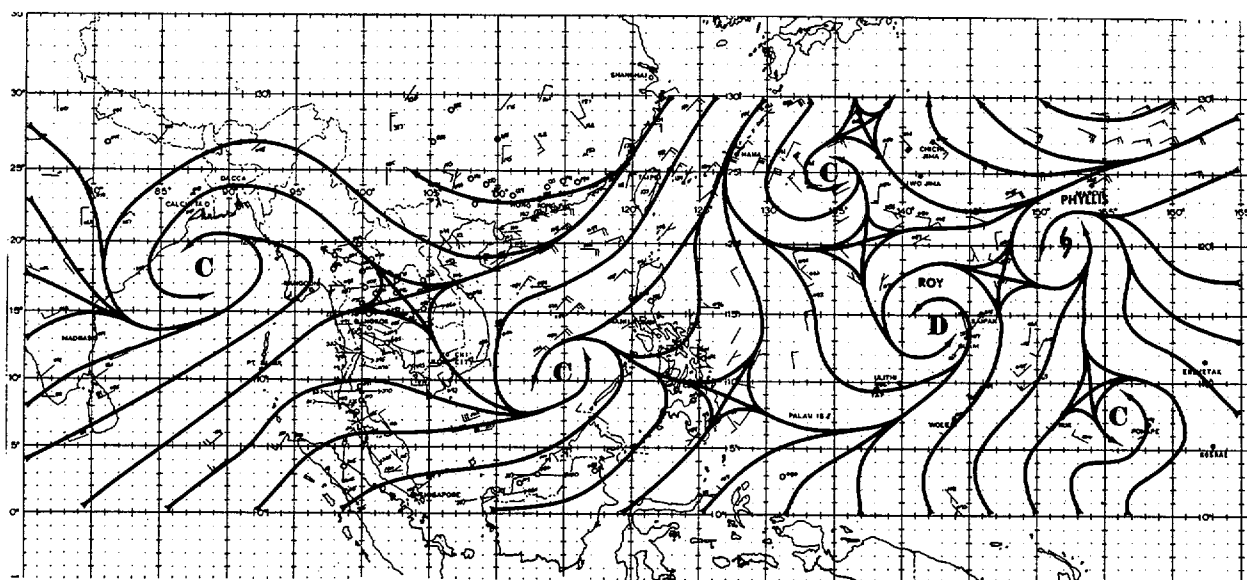


Figure 3-22-1. The 111200Z October surface/gradient level analysis during the formative stage of Tropical Storm Susan.

The upper-air pattern present during the development stage of Susan is shown in Figure 3-22-2. The anticyclone over the South China Sea is well-formed and distinct from one northeast of Guam. In fact, the upper-level anticyclone over the Pacific Ocean does not resemble the typical outflow pattern from a tropical storm. The system is much more representative of the climatological synoptic scale high. The overall pattern shows clearly that Susan developed on its own merits and not as a result of a "sympathetic" reaction.

The disturbance, which would later develop into Susan, was first noticed on 10 October as a loosely defined but very broad low-level circulation in the central South China Sea. Synoptic data showed that winds of 10 to 20 kt (5 to 10 m/s) were present

with the disturbance. The inflow pattern covered a very large area and was slow to consolidate. During this consolidation period the system remained nearly stationary.

By 110600Z the system had started to accelerate to the west along the axis of the monsoon trough. The convection and organization had both increased significantly, resulting in the issuance of a TCFA at 110730Z. By now winds near the center were 20 to 25 kt (10 to 13 m/s). The storm continued to develop as it moved quickly to the west-northwest, with the first warning issued at 111800Z. Susan made landfall as a 35 to 40 kt (18 to 21 m/s) tropical storm just north of Nha Trang, Vietnam (WMO 48877) some 16 hours later (Figure 3-22-3). After landfall, Susan turned northwest and

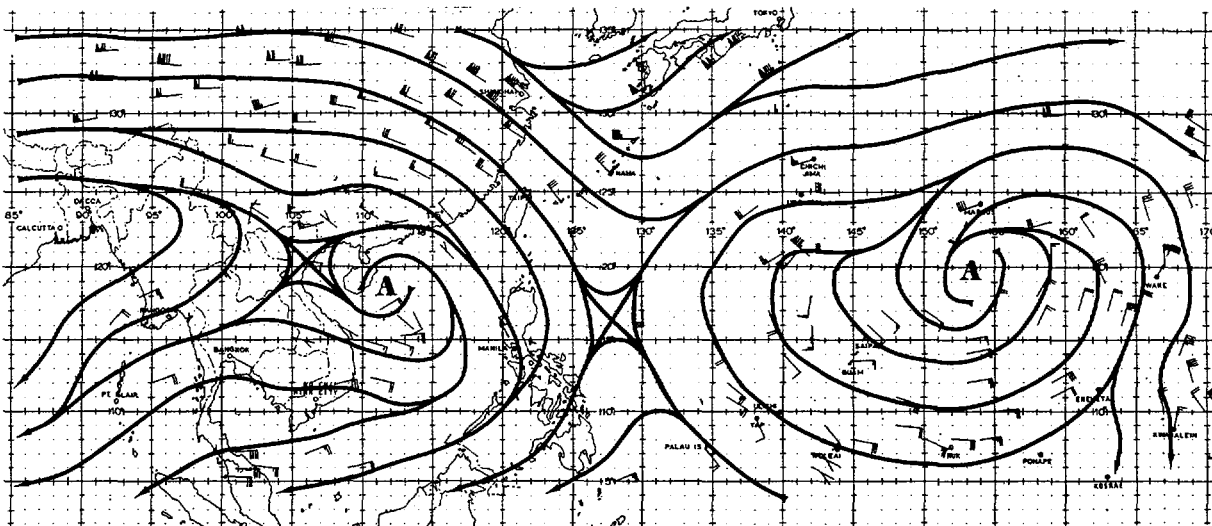


Figure 3-22-2. The 110000Z October 200 mb analysis. The upper-level anticyclone over the South China Sea is an independent system. It was not formed by the outflow pattern of the two tropical storms near Guam. (The 111200Z 200 mb analysis had insufficient data to conduct a meaningful analysis).

transited up the Mekong Valley. Even though Susan dissipated as a significant tropical cyclone at 130000Z, its remnants were still evident three days later as an area of convection just to the west of Hanoi (WMO 48820). Initial reports indicate 33 people were killed and some 68,000 families left homeless due to the heavy rains and floods which accompanied Susan. Thousands of hectares of ripening autumn rice were also reported destroyed.

In summary, although Susan was simultaneously active with three other tropical cyclones, analysis proves that it was not a sympathetic storm induced by the inflow/outflow patterns of its companions. Susan started as a very broad system embedded in the monsoon trough and stayed in the axis of the through as it moved inland over Vietnam. Once over land it recurved to the north but was identifiable for several more days.

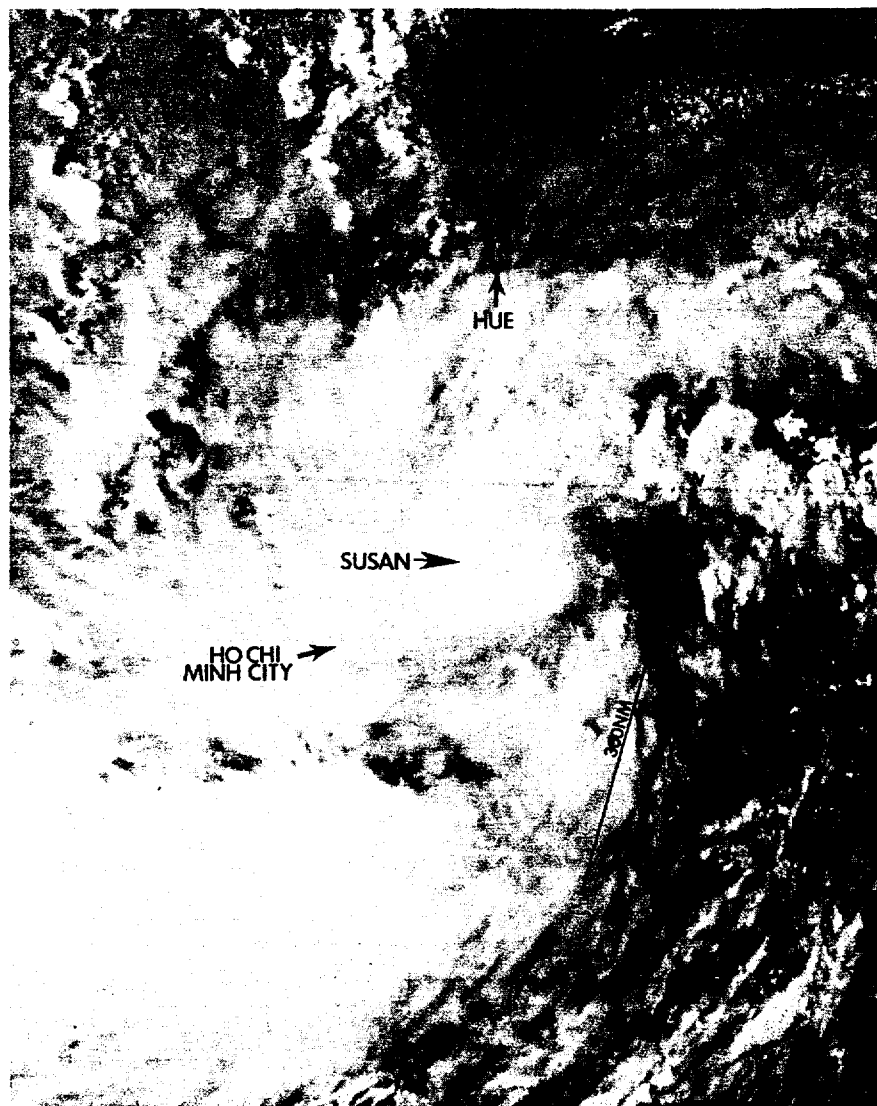


Figure 3-22-3. Tropical Storm Susan near maximum intensity. The storm made landfall over coastal Vietnam two hours later (120822Z October NOAA visual imagery).